
Splittail Persistence in the Petaluma River

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Introduction

Splittail (*Pogonichthys macrolepidotus*) is a large native minnow found only in the San Francisco Estuary (Moyle et al. 2004; Sommer et al. 2007). The distribution for much of the year is focused in the Delta and Suisun Bay, but adults undergo annual migrations to floodplain spawning habitat during winter. Splittail are also known to occur in the Napa and Petaluma rivers, two tributaries to San Pablo Bay. One of the more surprising recent findings is that Baerwald et al. (2007) determined that splittail from the Napa and Petaluma Rivers showed evidence of genetic differentiation from the Central Valley population. These results suggest some level of population structuring in the species.

Feyrer et al. (In press) provide a possible mechanism for this difference--the apparent ability of age-0 splittail to rear in brackish water almost immediately after being born may be one of the fundamental mechanisms supporting splittail production in the Napa and Petaluma rivers. However, splittail do not tolerate salinities > 23 ppt (Young and Cech 1996), which often occur between the outlets of these two tributaries in San Pablo Bay and the upstream population of splittail in Suisun Bay and the Delta. Hence, it is possible that seawater creates an isolating barrier between the Bay tributary and Central Valley populations of splittail. This barrier is "broken" during high flow periods when salinities drop throughout the upper estuary, but the typical geographical separation may be sufficient to maintain population structuring.

The discovery of genetically distinct splittail in the Napa and Petaluma rivers is of particular interest to U.S. Fish and Wildlife Service (2010), who are reevaluating whether the species deserves listing status. Splittail had previously been a focus of listing actions (Sommer et al. 2007), and the new genetic evidence provided additional motivation to the USFWS to reconsider the status of the species.

We were interested in whether splittail were still present in the Petaluma River. To our knowledge, the Petaluma River had not seen targeted sampling for splittail

since 2003, when Feyrer et al. (2005) conducted surveys. While Napa River was also of interest, we chose not to sample that tributary because rotary screw trapping has been initiated there by a local water district and could provide splittail information in the future.

Methods

We conducted a brief survey of the Petaluma River in the same general areas sampled by Feyrer et al. (2005). We chose June 1, 2010 for the survey, when we expected splittail would show peak abundance of young-of-the-year and sufficient size to be easily distinguishable in the field. Sampling was done on an incoming tide, so beaches were available, with a 50 foot beach seine at three sites—a large open-water mudflat and two small tidal channels.

Fin clips or whole fish samples were also collected for DNA analyses to examine the genetic composition of these fish (Baerwald et al. 2007). Microsatellite markers were used to assign individuals to either the Petaluma/Napa or the Central Valley population using the methods detailed in Baerwald et al. (2008).

Results and Discussion

The study sites had fairly consistent electrical conductivities (12,079-12,170; or about 6.8-7.0 ppt) and relatively warm temperatures (20.9-22.4°C). The survey captured thirteen splittail at two of the three sites. This compares well with previous surveys in the Petaluma River, where splittail were captured in one third of the beach seine hauls (Feyrer et al. 2005). The splittail collected ranged in size from 39 to 205 mm FL. Surprisingly, half of the fish were age-1 (e.g. >100 mm FL). Hence, it appears that splittail successfully spawned in 2010, a relatively wet year, and in 2009, a critically dry year.

All ten splittail that were genetically analyzed assigned to the Petaluma/Napa population. These individuals encompassed both young-of-year and age-1 life stages and provide further evidence of the continued persistence of this genetically distinct population in the Petaluma River.

The bottom line is that splittail appear to be alive and well in the Petaluma River. We hope that there will be additional opportunities to study this unique native fish and conduct fish surveys in the Petaluma River.

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